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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
DANIELS, MATTHEW J	
ART UNIT	**PAPER NUMBER**
1732	

DATE MAILED: 12/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/723,762	SWANSON ET AL.	
	Examiner	Art Unit	
	Matthew J. Daniels	1732	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 September 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. In the response received 30 September 2005, Claims 8 and 14 were amended, and Claim 20 is new.

Information Disclosure Statement

2. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, or by the Applicant's information disclosure statements, they have not been considered.

Specification

3. The objection to the specification is withdrawn in view of the amendments.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claim rejections set forth previously are withdrawn in favor of the rejections below.

5. **Claims 1, 2, 5, 6** are rejected under 35 U.S.C. 103(a) as being unpatentable over Crump (USPN 5340433) in view of Tan (USPN 5142211). Crump teaches a method for three-dimensional modeling comprising heating a build chamber to an elevated temperature (15:20-52), dispensing modeling material from an outlet of a dispensing head onto a base provided in a build chamber (Fig. 1) and moving the dispensing head and the base in three-dimensions with respect to one another in synchrony with the dispersing of modeling material so as to build up a three-dimensional object of predetermined shape on the base (16:17-68). Crump appears to be silent to maintaining physical and thermal separation between the heated build chamber and the gantry that controls motion of the dispensing head. However, these aspects would have been prima facie obvious over Tan, who teaches a method for controlling the movements of operating devices within a relatively large enclosure, which also includes a partition for maintaining physical and thermal separation between chamber and gantry (Figs. 1-10, for example). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Tan into that of Crump because Tan's apparatus beneficially prevents the escape of dust or other materials (3:60-68). One of ordinary skill would have recognized that Tan's enclosure could help maintain the temperature of the controlled environment of Crump. **As to Claim 2**, controlling motion of the base would have been obvious over Crump's teachings (16:17-38). **As to Claim 5**, Crump teaches that moving either of the dispensing head or base in any of the axes is possible (16:17-38). **As to Claim 6**, providing a feedstock material to an inlet external to the build chamber would have been prima facie obvious because Crump teaches a coil (Fig. 5) and the supply rod being inserted into the supply chamber (7:19-25).

6. **Claim 3** is rejected under 35 U.S.C. 103(a) as being unpatentable over Crump (USPN 5340433) in view of Tan (USPN 5142211), and further in view of Anderson (USPN 3494853). Crump and Tan teach the subject matter of Claim 1 above under 35 USC 103(a). **As to Claim 3,** Crump and Tan are silent to physical and thermal separation for the base. However, Anderson teaches a method for maintaining physical and thermal separation between the build chamber and the lift that controls the base (Fig. 1). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Anderson into that of Crump and Tan because doing so provides the ability to maintain a substantially unbroken or controllably modified condition throughout the entire operation (2:1-12).

7. **Claim 4** is rejected under 35 U.S.C. 103(a) as being unpatentable over Crump (USPN 5340433) in view of Tan (USPN 5142211). Crump and Tan teach the subject matter of Claim 1 above under 35 USC 103(a). **As to Claim 4,** Crump and Tan are silent to the claimed limitations. However, Gore teaches that either the layered material or the lower bead can be heated and controlled within well-defined temperature ranges to avoid weak bond formation (5:10-24). Gore additionally teaches that the equilibrium temperature is preferably only slightly below the solidification temperature of the liquid-phase material for objects that are built up rapidly (6:42-45). Because Gore additionally teaches depositing tin (6:65), which melts at approximately 232 degrees C, it would have been obvious to one practicing the combined method that in order to deposit tin, a build chamber temperature greater than 200 degrees C would be needed in order to provide an equilibrium temperature only slightly below the solidification temperature in order to maximize the build speed (6:42-45). Additionally,

Crump's teachings ((15:20-52)) and Gore's teachings (5:10-24) teaches that the temperature of the layered materials, and therefore the chamber that contains them, represents a result-effective variable that can be optimized. See MPEP 2144.05 II and *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Gore into that of Crump and Tan, and optimize chamber temperature, in order to minimize voids and avoid weak joint or bond formation and stress between layers.

8. **Claim 7** is rejected under 35 U.S.C. 103(a) as being unpatentable over Crump (USPN 5340433) in view of Tan (USPN 5142211), and further in view of Reiss (USPN 5581994) and Beeston (USPN 3472452). Crump and Tan teach the subject matter of Claim 1 above under 35 USC 103(a). **As to Claim 7**, although Crump teaches fins which would inherently direct flow of air, Crump and Tan appear to be silent to the claimed limitations. However, Beeston teaches a chamber heated by convection such that an air flow pattern is created in the chamber (Fig. 1, arrows 72 and 70). Reiss teaches a method for cooling a thermally loaded component by deflecting an air flow pattern towards the thermally loaded component (1:5-17). Crump teaches that control of the temperature around the dispensing head and guide tube is achieved by providing conditioned air to the area by means of a conduit (13:50-54). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the methods of Reiss and Beeston into that of Crump and Tan in order to a) provide temperature control of the area around the dispensing head by providing a conduit (Crump 13:50-54), b) provide a constant temperature inside an enclosure while the outside temperature varies at

random (Beeston 1:26-30), and c) cool the thermally loaded component by deflecting an air flow pattern towards the thermally loaded component (Reiss 1:5-17).

9. **Claims 8, 11, 12** are rejected under 35 U.S.C. 103(a) as being unpatentable over Crump (USPN 5340433) in view of Tan (USPN 5142211) and Anderson (USPN 3494853). **As to Claim 8**, Crump teaches a method for three-dimensional modeling comprising heating a build chamber to an elevated temperature (15:20-52), dispensing modeling material from an outlet of a dispensing head onto a base provided in a build chamber (Fig. 1) and moving the dispensing head and the base in three-dimensions with respect to one another in synchrony with the dispersing of modeling material so as to build up a three-dimensional object of predetermined shape on the base (16:17-68). Crump teaches motion control components (Items 36 and 38 in Fig. 11), but appears to be silent to their relation to the build chamber. However, Tan teaches isolation of head motion control components from the chamber (Figs. 1-10) and Anderson teaches isolation of base motion control components from a chamber (Fig.). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the methods of Tan and Anderson into that of Crump in order to because doing so provides the ability to maintain a substantially unbroken or controllably modified condition throughout the entire operation (Anderson, 2:1-12), and because Tan's apparatus beneficially prevents the escape of dust or other materials (Tan, 3:60-68). One of ordinary skill would have recognized that these enclosures could help maintain the temperature of the controlled environment of Crump. **As to Claim 11**, Crump teaches that moving either of the dispensing head or base in any of the axes is possible (16:17-38). Tan (Figs. 1-10) and Anderson (Fig. 1) also teach these

aspects. **As to Claim 12**, providing a feedstock material to an inlet external to the build chamber would have been prima facie obvious because Crump teaches a coil (Fig. 5) and the supply rod being inserted into the supply chamber (7:19-25).

10. **Claim 9 and 10** are rejected under 35 U.S.C. 103(a) as being unpatentable over Crump (USPN 5340433) in view of Tan (USPN 5142211) and Anderson (USPN 3494853), and further in view of Gore (USPN 5257657). Crump, Tan and Anderson teach the subject matter of Claim 8 above under 35 USC 103(a). **As to Claims 9 and 10**, Crump, Tan, and Anderson are silent to the particular limitations. However, Gore teaches that either the layered material or the lower bead can be heated and controlled within well-defined temperature ranges to avoid weak bond formation (5:10-24). Gore additionally teaches that the equilibrium temperature is preferably only slightly below the solidification temperature of the liquid-phase material for objects that are built up rapidly (6:42-45). Because Gore additionally teaches depositing tin (6:65), which melts at approximately 232 degrees C, it would have been obvious to one practicing the combined method that in order to deposit tin, a build chamber temperature greater than 150 degrees C or 200 degrees C would be needed in order to provide an equilibrium temperature only slightly below the solidification temperature in order to maximize the build speed (6:42-45). Additionally, Crump's teachings ((15:20-52)) and Gore's teachings (5:10-24) teaches that the temperature of the layered materials, and therefore the chamber that contains them, represents a result-effective variable that can be optimized. See MPEP 2144.05 II and *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Gore into that of Crump

and Tan, and optimize chamber temperature, in order to minimize voids and avoid weak joint or bond formation and stress between layers. It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Gore into that of Crump, Tan, and Anderson in order to minimize voids and avoid weak joint or bond formation and stress between layers.

11. **Claim 13** is rejected under 35 U.S.C. 103(a) as being unpatentable over Crump (USPN 5340433) in view of Tan (USPN 5142211) and Anderson (USPN 3494853), and further in view of Reiss (USPN 5581994) and Beeston (USPN 3472452). Crump, Tan, and Anderson teach the subject matter of Claim 8 above under 35 USC 103(a). **As to Claim 13**, although Crump teaches fins which would inherently direct flow of air, Crump and Tan appear to be silent to the claimed limitations. However, Beeston teaches a chamber heated by convection such that an air flow pattern is created in the chamber (Fig. 1, arrows 72 and 70). Reiss teaches a method for cooling a thermally loaded component by deflecting an air flow pattern towards the thermally loaded component (1:5-17). Crump teaches that control of the temperature around the dispensing head and guide tube is achieved by providing conditioned air to the area by means of a conduit (13:50-54). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the methods of Reiss and Beeston into that of Crump, Tan, and Anderson in order to a) provide temperature control of the area around the dispensing head by providing a conduit (Crump 13:50-54), b) provide a constant temperature inside an enclosure while the outside temperature varies at random (Beeston 1:26-30), and c) cool the thermally

loaded component by deflecting an air flow pattern towards the thermally loaded component (Reiss 1:5-17).

12. **Claim 14, 17, 18, and 20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Crump (USPN 5340433) in view of Tan (USPN 5142211) and Anderson (USPN 3494853). **As to Claim 14**, Crump teaches a method for three-dimensional modeling comprising heating a build chamber to an elevated temperature (15:21-52) dispensing modeling material from an outlet of a dispensing head onto a base provided in a build chamber (Fig. 1) and moving the dispensing head and the base in three-dimensions with respect to one another in synchrony with the dispersing of modeling material so as to build up a three-dimensional object of predetermined shape on the base (16:17-68). Crump teaches motion control components (Items 36 and 38 in Fig. 11), but appears to be silent to their relation to the build chamber and to the deformable thermal insulator. However, Tan teaches isolation of head motion control components from the chamber (Figs. 1-10) by a deformable thermal insulator (3:60-68) and Anderson teaches isolation of base motion control components from a chamber (Fig.). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the methods of Tan and Anderson into that of Crump in order to because doing so provides the ability to maintain a substantially unbroken or controllably modified condition throughout the entire operation (Anderson, 2:1-12), and because Tan's apparatus beneficially prevents the escape of dust or other materials (Tan, 3:60-68). One of ordinary skill would have recognized that these enclosures could help maintain the temperature of the controlled environment of Crump. **As to Claim 17**, Crump teaches that moving either of the dispensing head or base in any of the axes is

possible (16:17-68). Tan and Anderson also appear to teach these aspects. **As to Claim 18,** providing a feedstock material to an inlet external to the build chamber would have been prima facie obvious because Crump teaches a coil (Fig. 5) and the supply rod being inserted into the supply chamber (7:19-25). **As to Claim 20,** the Examiner takes the position that this is an apparatus limitation that does not materially affect the claimed method, and therefore is not given patentable consideration in the claimed method. However, Anderson (Fig. 2, Item 56) and Tan (Fig. 8, Item 21a) teach deformable insulators that can be considered to be baffles.

13. **Claim 15 and 16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Crump (USPN 5340433) in view of Tan (USPN 5142211) and Anderson (USPN 3494853), and further in view of Gore (USPN 5257657). Crump, Tan, and Anderson teach the subject matter of Claim 14 above under 35 USC 103(a). **As to Claims 15 and 16,** Crump, Tan, and Anderson are silent to the particular limitations. However, Gore teaches that either the layered material or the lower bead can be heated and controlled within well-defined temperature ranges to avoid weak bond formation (5:10-24). Gore additionally teaches that the equilibrium temperature is preferably only slightly below the solidification temperature of the liquid-phase material for objects that are built up rapidly (6:42-45). Because Gore additionally teaches depositing tin (6:65), which melts at approximately 232 degrees C, it would have been obvious to one practicing the combined method that in order to deposit tin, a build chamber temperature greater than 150 degrees C or 200 degrees C would be needed in order to provide an equilibrium temperature only slightly below the solidification temperature in order to maximize the build speed (6:42-45). Additionally, Crump's teachings ((15:20-52)) and Gore's teachings (5:10-24) teaches that the

temperature of the layered materials, and therefore the chamber that contains them, represents a result-effective variable that can be optimized. See MPEP 2144.05 II and *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Gore into that of Crump and Tan, and optimize chamber temperature, in order to minimize voids and avoid weak joint or bond formation and stress between layers. It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Gore into that of Crump, Tan, and Anderson in order to minimize voids and avoid weak joint or bond formation and stress between layers.

14. **Claim 19** is rejected under 35 U.S.C. 103(a) as being unpatentable over Crump (USPN 5340433) in view of Tan (USPN 5142211) and Anderson (USPN 3494853), and further in view of Caugherty (USPN 2117651). Crump, Tan, and Anderson teach the subject matter of Claim 14 above under 35 USC 103(a). **As to Claim 19**, Crump, Tan, and Anderson appear to be silent to the claimed limitation. However, it would have been prima facie obvious over Caugherty because Caugherty teaches removing a buildup of material from a cylindrical rod by driving the cylindrical rod against a rotating member of a cleaning assembly (Fig. 2). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Caugherty into that of Crump, Tan, and Anderson in order to completely loosen scale on the rod-like extrusion heads of Crump (Fig. 5).

Response to Arguments

15. Applicant's arguments filed 30 September 2005 have been fully considered but they are not persuasive or are moot in view of the new rejections. The arguments appear to be on the grounds that the cited references do not disclose or suggest maintaining a physical and thermal separation between the heated build chamber and a gantry, as required by Claim 1, or the motion control components being located external to the build chamber and in thermal isolation from the build chamber.

16. These arguments are believed to be addressed by the new references and rejections which show movement of base and head, each in thermal isolation from a chamber, is a known aspect in the art.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J. Daniels whose telephone number is (571) 272-2450. The examiner can normally be reached on Monday - Friday, 7:30 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Colaianni can be reached on (571) 272-1196. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MJD 12/15/05

MJD

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